

CLAIMS

- 5 1. A color forming composition, comprising:
 - a) a color forming leuco dye;
 - b) an activator having at least one acid group, said at least one acid group being protected by a protection leaving group to form a protected activator; and
 - 10 c) a deprotecting agent configured for removing the protection leaving group from the activator upon application of energy.
- 15 2. The composition of claim 1, wherein the activator comprises at least one functional group selected from the group consisting of hydroxyl, thio, and amine groups,
and wherein the hydroxyl, thio, and amine groups act as a Lewis acid.
- 20 3. The composition of claim 1, wherein the activator is a member selected from the group consisting of phenols, carboxylic acids, cyclic sulfonamides, protonic acids, and mixtures thereof.
- 25 4. The composition of claim 3, wherein the activator is bis-(3-allyl-4-hydroxyphenyl)sulfone.
- 30 5. The composition of claim 3, wherein the activator is a carboxylic acid selected from the group consisting of boric acid, oxalic acid, maleic acid, tartaric acid, citric acid, succinic acid, benzoic acid, stearic acid, gallic acid, salicylic acid, ascorbic acid, and mixtures thereof.
- 35 6. The composition of claim 1, wherein the protected activator is a member selected from the group consisting of esters, sulfonates, ethers, phosphinates, carbonates, carbamates, and mixtures thereof.

7. The composition of claim 6, wherein the protected activator is an ester selected from the group consisting of formate ester, acetate ester, isobutyrate ester, levulinate ester, pivaloate ester, aryl pivaloate esters, aryl
5 methanesulfonate esters, adamantoate ester, benzoate ester, 2,4,6-trimethylbenzoate (mesitoate) ester, 2-trimethyl silyl ester, 2-trimethylsilyl ethyl ester, t-butyl ester, p-nitrobenzyl ester, nitrobutyl ester, trichloroethyl ester, 9-fluorenecarboxylate, xanthene carboxylate, and mixtures thereof.

10 8. The composition of claim 6, wherein the protected activator is a sulfonate selected from the group consisting of methanesulfonate, toluenesulfonate, 2-formylbenzenesulfonate, and mixtures thereof.

9. The composition of claim 6, wherein the protected activator is an ether
15 selected from the group consisting of silyl ethers, alkyl ethers, aromatic ethers, and mixtures thereof.

10. The composition of claim 6, wherein the protection leaving group is an acyl selected from the group consisting of formate, acetate, levulinate,
20 pivaloate, and mixtures thereof.

11. The composition of claim 6, wherein the protection leaving group is acetate.

25 12. The composition of claim 1, wherein the deprotecting agent is a member selected from the group consisting of valoneol, prolinol, 2-hydroxy-1-amino-propanol, 2-amino-3-phenyl-1-propanol, (R)-(-)-2-phenyl glycitol, 2-amino-phenylethanol, 1-naphthylethyl amine, 1-aminonaphthalene, morpholin, and mixtures thereof.

30 13. The composition of claim 12, wherein the deprotecting agent is 2-hydroxy-1-amino-propanol.

14. The composition of claim 1, wherein the color forming leuco dye is selected from the group consisting of fluorans, phthalides, aminotriarylmethanes, and mixtures thereof.

5

15. The composition of claim 1, wherein the protection leaving group is an acyl and the deprotecting agent is an alpha hydroxyl amine.

16. The composition of claim 1, further comprising an infrared radiation 10 absorber.

17. The composition of claim 1, wherein the color forming composition is spin-coatable.

15 18. An optical disk, comprising an optical disk substrate having a color forming composition coated thereon, said color forming composition comprising:

- 20 a) a color forming leuco dye;
- b) an activator having at least one acid group, said at least one acid group being protected by a protection leaving group to form a protected activator; and
- c) a deprotecting agent configured for removing the protection leaving group from the activator upon application of energy.

19. The optical disk of claim 18, wherein the protected activator is a 25 member selected from the group consisting of esters, sulfonates, ethers, phosphinates, carbonates, carbamates, and mixtures thereof.

20. The optical disk of claim 18, wherein the deprotecting agent is selected from the group consisting of valoneol, prolinol, 2-hydroxy-1-amino-30 propanol, 2-amino-3-phenyl-1-propanol, (R)-(-)-2-phenyl glycinol, 2-amino-phenylethanol, 1-naphthylethyl amine, 1-aminonaphthalene, morpholin, and mixtures thereof.

21. The optical disk of claim 18, wherein the leuco dye is selected from the group consisting of fluorans, phthalides, aminotriarylmethanes, and mixtures thereof.

5

22. The optical disk of claim 18, wherein the color forming composition further comprises an infrared radiation absorber admixed with or in thermal contact with the protected activator and deprotecting agent.

10

23. The optical disk of claim 18, wherein the color forming composition further comprises a binder.

24. The optical disk of claim 18, wherein the color forming composition further comprises a non-leuco colorant.

15

25. A method for preparing color forming compositions, comprising:

- a) attaching a protection leaving group to an acid-containing activator to form a protected activator; and
- b) combining the protected activator with a color forming leuco dye and a deprotecting agent configured for removing the protection leaving group from the activator upon application of energy.

20

26. A method of forming color images on a substrate, comprising:

25

- a) applying a color forming composition onto a substrate, said color forming composition including:
 - i) a color forming leuco dye;
 - ii) an activator having at least one acid group, said at least one acid group being protected by a protection leaving group; and
 - iii) a deprotecting agent configured for removing the protection leaving group from the activator upon application of heat; and
- b) applying heat sufficient to remove the protection leaving group without decomposing the color forming composition.

30

27. The method of claim 26, wherein the heat is applied at from about 0.3 to about 0.5 J/cm².

5 28. The method of claim 26, wherein the heat is applied for about 10 to about 100 microseconds.

10 29. The method of claim 26, wherein the color forming composition further comprises an infrared radiation absorber admixed with or in thermal contact with the activator and deprotecting agent.

30. The method of claim 29, wherein the heat is applied using an infrared laser.

15 31. The method of claim 26, wherein the activator and protection leaving group form a member selected from the group consisting of esters, sulfonates, ethers, phosphinates, carbonates, carbamates, and mixtures thereof.

20 32. The method of claim 26, wherein the deprotecting agent is selected from the group consisting of valoneol, prolinol, 2-hydroxy-1-amino-propanol, 2-amino-3-phenyl-1-propanol, (R)-(-)-2-phenyl glycinol, 2-amino-phenylethanol, 1-naphthylethyl amine, 1-aminonaphthalene, morpholin, and mixtures thereof.

33. The method of claim 26, wherein the substrate is an optical disk.